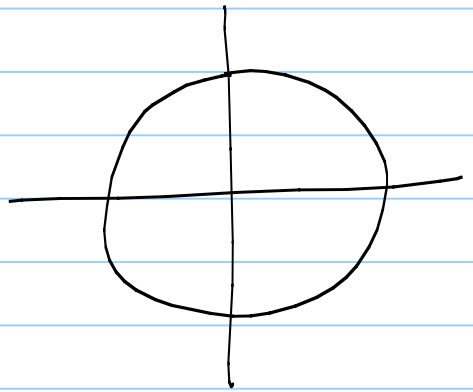
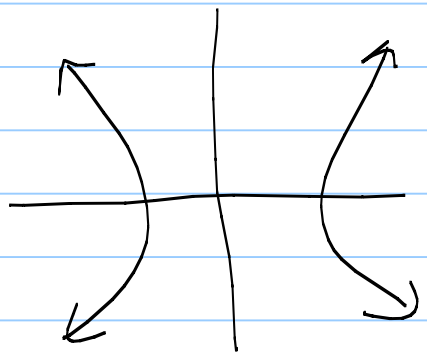
FUNCTIONS AND THEIR GRAPHS

Note Title 2/3/2009

RELATIONS: A SET OF ORDERED PAIRS

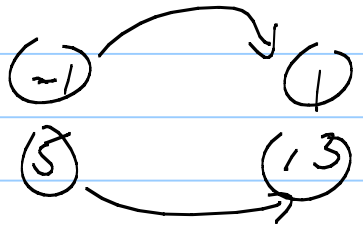




FUNCTION: IS A MAPPING THAT ASSOCIATES WITH EACH NUMBER x IN ONE SET (DOMAIN) WITH EXACTLY ONE NUMBER y IN ANOTHER SET (RANGE)

IE $f(x) = 2x + 3$

DOMAIN



RELATION = ALL GRAPHS

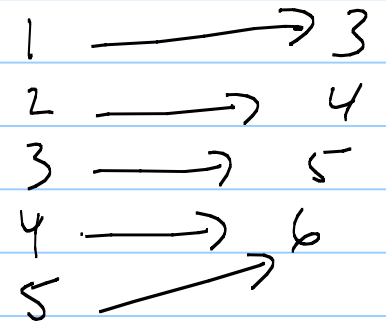
FUNCTIONS = SPECIFIC GRAPHS

FUNCTION $\{(x, y) \mid (1, 2)(3, 4)(5, 6)(7, 10)(9, 10)\}$

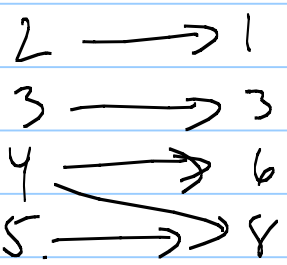
NOT A FUNCTION $\{(x, y) \mid (1, 2)(3, 4)(5, 6)(7, 10)(3, 5)\}$

(x) (y)

IN OUT



FUNCTION



NOT A FUNCTION

How Functions are Represented

1.) Graph
2.) Equation
3.) Table of values
4.) Ordered Pairs
5.) Statement

Graphs of Functions

- The graph of a function f is a drawing that represents all of the pairs of the set $(x, f(x))$ if the function is written as an equation $y = f(x)$

THE TEST FOR FUNCTIONS

1.) VERTICAL LINE TEST

2.) LOOK FOR EVEN POWER VALUES OF y

* THE HIGHEST POWER OF y CANNOT BE EVEN *

IS

$x^2 + y^2 = 9$

$2x + 3x^2 + y^4 = 26$

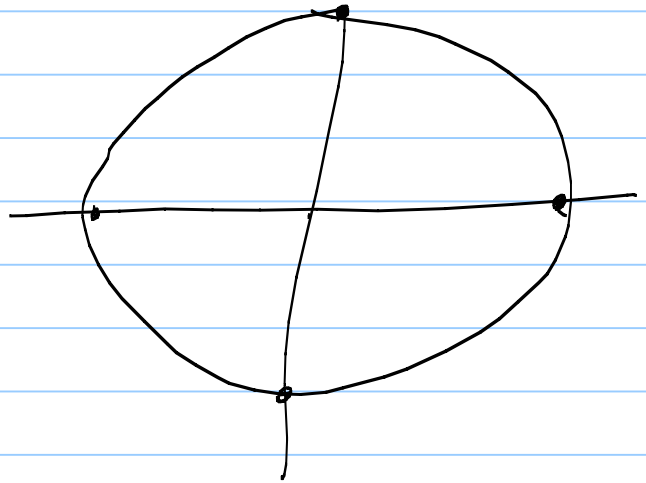
} NOT

$y^3 + y^2 + 2x + 9 = 23$ FUNCTION

Graph $x^2 + y^2 = 9$

$y^2 = 9 - x^2$

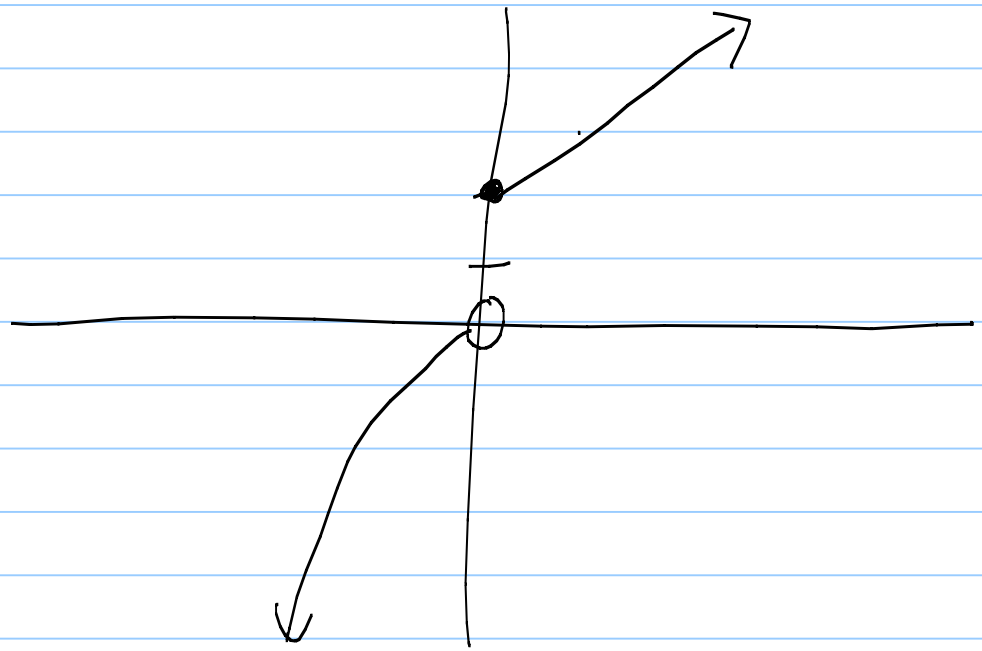
$y = \pm\sqrt{9 - x^2}$



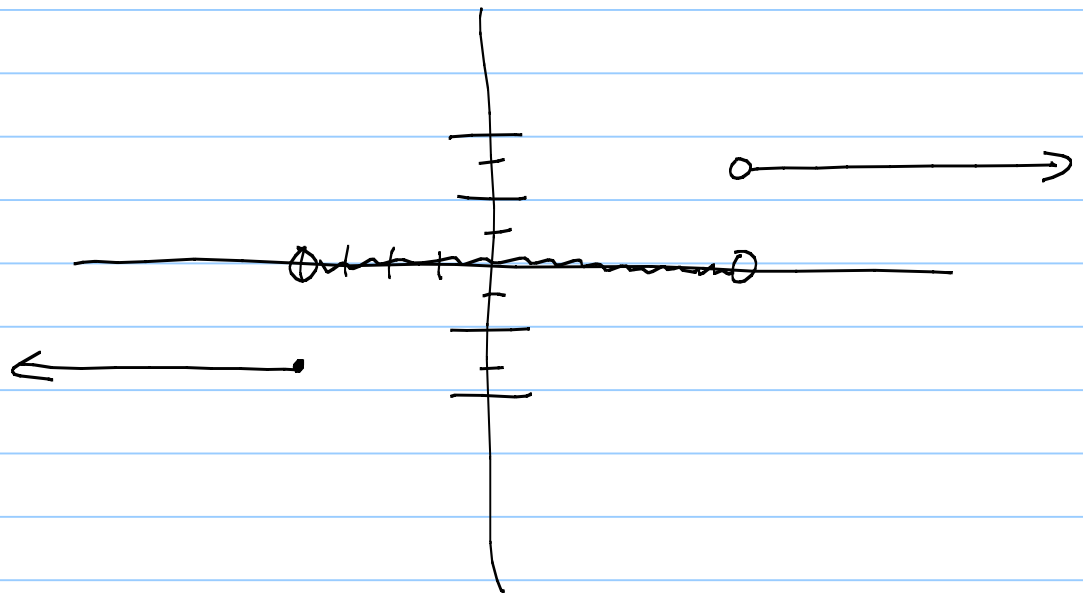
x	y
0	± 3
1	$\pm\sqrt{8}$
2	$\pm\sqrt{5}$
3	0
-3	0

PIECEWISE FUNCTIONS - A GRAPH OF MANY "PIECES" OF FUNCTIONS OVER SPECIFIC DOMAINS

Ex $y = \begin{cases} x+2 & x \in [0, \infty) \\ -x^2 & x \in (-\infty, 0) \end{cases}$

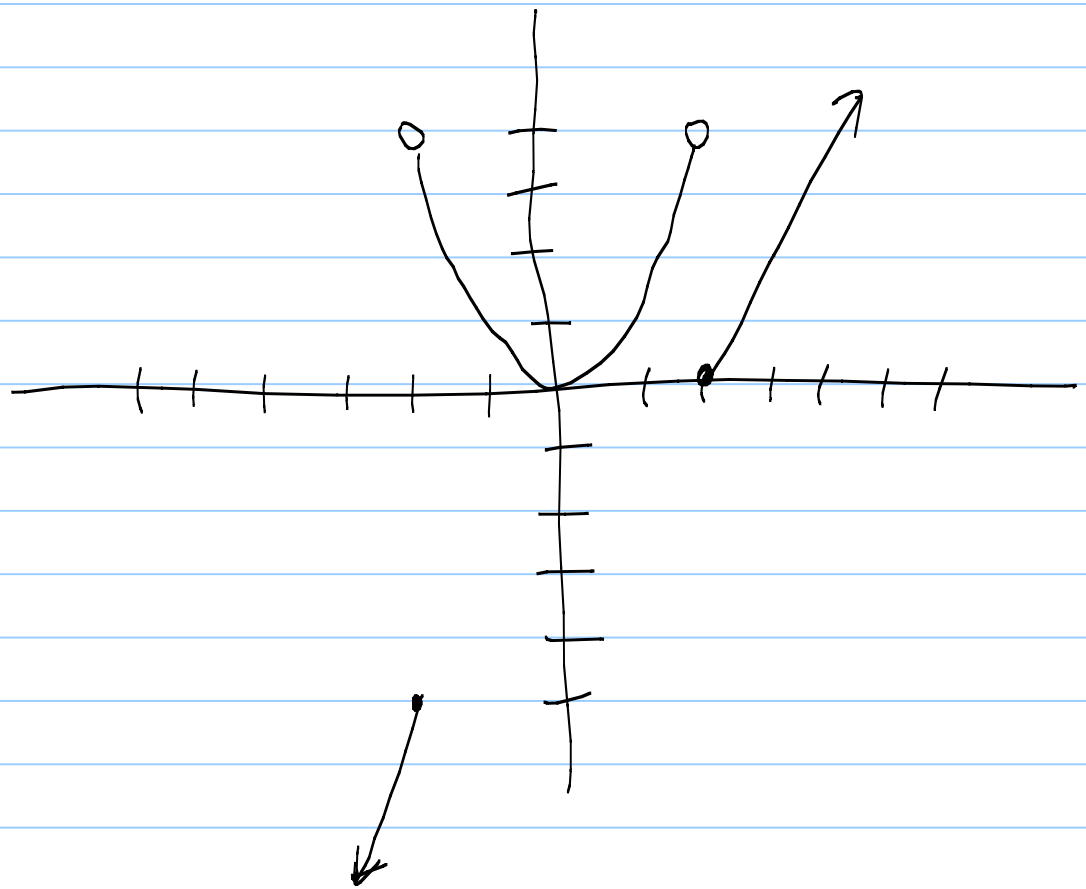


$$y = \begin{cases} -3 & x \in (-\infty, -4] \\ 0 & x \in (-4, 4) \\ 3 & x \in (4, \infty) \end{cases}$$



IE

$$y = \begin{cases} 4x + 3 & x \leq -2 \\ x^2 & -2 < x < 2 \\ 2x - 4 & x \geq 2 \end{cases}$$



§4.3 # 15-26, 29-31, 33, 34